

The Evolution of the Local Role of the University

Francisco Javier Ortega-Colomer

PhD Student

INGENIO (CSIC – UPV)

fraorco@ingenio.upv.es

Abstract

The role of Higher Education Institutions (HEIs) in society has been intensely debated and has usually re-emerged when HEIs are going through difficult times. The role that HEIs play within their societal environment will depend, among other factors, on the specific characteristics of the region in which they are located. Each region has to face different challenges framed by a different history and culture, and HEIs therefore follow different development patterns. HEIs have to respond as well to global changes and challenges. Therefore, their role has to be analysed in relation to their immediate environment, while also taking into consideration the institutions and organisations that surround it.

In this contribution, I focus on the changing role of the HEIs in a local environment characterized by a high presence of small and medium firms from a specific traditional industry (a geographical space traditionally termed as an industrial district or cluster). To study this evolution, the research will address two main questions. First, how local HEIs are responding to the changes in the local and global environment; and secondly, how the local demand (mainly from the industrial sector) for knowledge is evolving. Answering these two questions requires the integration of two different fields of study: the analysis of the changing role of the HEIs and the study of the dynamics of knowledge generation and dissemination within specific local contexts.

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1. The University and its Context

Over the years, the role of Higher Education Institutions (HEIs) in society has been intensely debated, the question reigniting most often when HEIs have been experiencing difficult times. The role that HEIs play within their societal environment will depend, among other factors, on the specific characteristics of the region in which they are located, that is, their context. Each region has historically faced different challenges; therefore HEIs have followed different developmental patterns. Yet, HEIs have all responded to the changes and challenges posed, among others, by globalisation trends and the development of information and communication technologies (ICT).

The importance of *context* on the evolution and role of HEIs has been analysed by various scholars. This paper will focus on a specific context: a specialised industrial agglomeration within a mature sector. The literature concerning the location of firms and the dynamics of agglomeration has developed two main concepts for analysing industrial agglomerations: industrial district and cluster (Becattini, 1979; Porter, 1990; Porter, 1998; Becattini *et al.*, 2009). While the industrial district concept traces its roots back to the late 19th century, the cluster concept was born during the 1990s to understand not only the new competitive forces at play, but also to promote deliberate policy initiatives that foster linkages --“cooperation”-- among firms and institutions which are simultaneously “competing” (Porter, 1998). Since the late 1990s, a third approach, the local innovation system, has also contributed to this debate by highlighting knowledge dynamics and interactions between different actors (institutions) in order to gain a more precise insight into the innovation processes in a local setting. This paper adopts the local innovation system approach; given its focus on analysing those institutions generating and disseminating new knowledge, this approach is the most appropriate to scrutinize the evolution of a local HEI within a specific setting.

1.1. The Changing Role of HEIs

Throughout their long history, HEIs have been considered organisations key to society for their central role in fostering and propagating knowledge. Since the 1990s, it has been argued that HEIs have been moving from “an ivory tower to an entrepreneurial paradigm” (Clark, 1998; Etzkowitz *et al.*, 2000). This transition still remains the focus of attention for many researchers, policy-makers and analysts in universities, governments and supranational organisations (Martin, 2003; OECD, 2007). All of these higher education experts are concerned with the consequences and the challenges of this new era that continues to shape the role of today’s university.

1.1.1. The End of the University Monopoly on Supplying Knowledge

In recent years, the number of universities has substantially increased. Likewise, “tertiary education enrolment surpassed 50 percent in Japan, the United States and Western Europe” (Teichler, 2001: 3). With this dramatic increase in educational offerings, a shift has occurred in the role of the university as other organisations have emerged supplying services in direct competition. Although universities have traditionally been the institutions tasked with creating and supplying knowledge to society, amidst increased demand the 20th century witnessed the appearance of new players offering to fulfil these functions. Examples of these alternative institutions included technology institutes, technology-based consultancy firms, government laboratories, industries and think tanks. However, despite the fact that these increasingly important actors tended to diversify the sites of knowledge

production (Gibbons, 1994), universities have remained at the centre of the (knowledge production) system and, what is more, those *new actors* rely heavily on university's expertise (Godin & Gingras, 2000: 273).

Today's evolving information society, along with the revolution in ICTs, has favoured the introduction of these new players, further weakening the university's traditional grip over multiple areas of knowledge generation and diffusion. For this reason, many argue that the university should now limit itself to fewer roles, thereby preserving its traditional core tasks, and step away from the new, more demanding enterprises, such as spin-off creation, life-long learning, and patent licensing. Notwithstanding, these novel activities already make up the everyday life of many HEIs. Their incorporation into the genetic makeup of these institutions has varied, but the importance of local context has been consistent in each, for instance, with respect to *the traditional way of doing things*. A process of adaptation to this new technology-based context has been challenged, pointing to stronger ties between components of the system rather than a marginalisation of any one actor involved in the knowledge production system (Godin, 2000: 277). In this sense, a detailed analysis of how the system has evolved is required instead of characterising the roles of each isolated actor.

1.1.2. The Emergence of the New Public Management Approach in Higher Education

Throughout the last two decades of the 20th century, a new field of studies generally known as "higher education research", emerged to address the problems, tensions and dilemmas that the increasingly complex higher education system has been confronting. This new field of research remains inextricably linked to the debates concerning higher education policy and practice (Kogan & Henkel, 2000; Teichler & Sadlak, 2000; Teichler, 2003: 171), and has also served as an attempt "to anticipate future problems and themes of debates in order to develop concepts and generate knowledge well in advance" (ibid: 171), for instance, with respect to funding issues, management and governance styles or the decision-making processes at the university level. Especially, the university decision-making process has been intensely debated and, consequently, each institution has created its own "university culture" for making decisions (Mora, 2001). From a broader perspective, this aspect of decision-making entails a higher level of complexity in the study of the changing university's role. Most of the conflicts in the HEI decision-making process can be attributed to the differing-- and even contradictory-- values and purposes of their members (Hölttä & Nuotio, 1995: 15; Birnbaum, 1988). Clark characterises the university as a complex, loosely-coupled, yet expert organisation (Clark, 1986). This author stresses two main dimensions: the institutional (structured, formal and locally-rooted) and the disciplinary/academic (unstructured, flexible, and international). On occasion, these two dimensions encounter tensions that are context-based. A better understanding of the university as an open system is therefore required, taking into account that different subsystems within the university are not always connected, due to their identity and autonomy (Glassman, 1973; Weick, 1976). The concept of "loose coupling" helps explain the persistence of diversity within a given university (Birnbaum, 1988).

In short, it is understood that HEIs interact simultaneously with both their environment and their internal issues. The environment, which can include markets, stakeholders and political and economic factors, is difficult to predict. The internal issues are likewise manifold: academic freedom, leadership, social values, and interaction, to name only a

few. Yet the complex task of studying these internal issues and the environment has increased due to other societal shifts, for instance, globalisation and, in the case of the European Union, the pressure for comparability between countries and regions.

1.2. The Importance of Knowledge Dynamics

In the late 1980s, the innovation systems approach blossomed as a complement to the industrial district and cluster models. It offered an alternate way to analyse the dynamics of industrial growth and the geographical concentration of many economic activities. The principal concept from which different versions started to branch off was the *national innovation system*. This framework suggested the study of heterogeneous institutions and their interactions as a way to explain innovation; in principle it was thus an approach more than a prescription. This approach focuses on the ability to create, search, exploit and distribute knowledge between different societal sectors and thereby provide plausible explanations for the differences in economic performance among countries, regions, sectors and firms. In this sense, science and technology organisations are called upon to re-think their role so they might contribute more directly to economic development. As creators of new knowledge, universities are necessarily involved as well. Since the aim of the present paper is to study the evolution of the role of an HEI, this framework appears particularly constructive for understanding the variety of contributions made by this type of organisation to economic development. In this regard, knowledge is increasingly considered not only as an academic object of study, but also as a vehicle to enhance the innovative performance of organisations.

2. Research Task: The Evolution of the Local Role of a University in a Traditional Industrial Area

One underrepresented question in the analysis of agglomeration-based models (industrial districts and clusters) has to do with the role that HEIs have played in different time periods and in specific local contexts. In contrast, this question has recently been addressed using the innovation systems approach in its different forms: local, regional, national and sectoral (Lester, 2007). The focus of attention of the present paper will thus be the study of an HEI's role, using concepts and questions from the local system innovation approach. While the industrial district approach has tended to highlight the importance of historical, social and cultural aspects in the study of how a set of geographically concentrated small and medium firms could remain competitive overtime, the cluster perspective has usually outlined a set of useful heuristic tools to understand the competitive sources of firms. A possible explanation of why few studies have addressed in detail the role of universities within studies of industrial districts and clusters is that these two approaches have only partially referred to the importance of knowledge generation and dissemination. For that reason, the local innovation systems approach would help to achieve this task, since some attempts have been made in that sense (Acs, 2000; Lester, 2007; Plechero, 2007). In this vein, and since the local innovation system approach has stressed *knowledge* as a crucial factor to include alongside the classical production factors (land, capital and labour), this perspective can more easily accommodate our object of study: the evolution of an HEI's local role.

To date, in a complementary manner to the above, few studies have been conducted that have minutely analysed the evolution of the local role of HEIs within a context characterised by a high concentration of traditional industries

from a historical perspective. Taking the above mentioned districts, the present paper will attempt to fill this gap by answering two main questions:

1. How has the role of an HEI evolved in a *low-tech context*, including changes in its interactions with society at different levels (local, regional, national, international)?
2. How have HEI personnel identified the local needs of *new* knowledge over the last thirty years (to improve their performance)?

To address these two questions, the integration of two different study fields is required: on the one hand, the analysis of the changing role of the HEIs, and on the other, the study of the dynamics of knowledge generation and dissemination within specific local contexts. Empirically, the study is focused on the institutional-level analysis, adopting a bottom-up perspective from the university to the system level. For instance, while most of the studies assume that all the actors located in a region are relevant to the system, we only concentrate on those who actually are (or have ever been) related with the university, according to the extracted information. This way we can also analyse the evolution of the types of mechanisms that have contributed to the development of different (actual) actors at different levels from an innovation viewpoint. Indeed, this approach can abandon the firm perspective, but we think that despite the paramount importance of the university presence, HEIs have traditionally been neglected. Therefore, a study of their historical contribution will shed light on the problems and dilemmas that have been overcome not only from the institutional level but also from the academic level. Considering the latter, our strategy is not to take the districts chosen as a local innovation system for granted, but to explore how the university has contributed *to its building*.

3. “How” the study is conducted: Case Study as Methodology

“A case study is a story about something unique, special, or interesting” (Neale *et al.*, 2006: 34).

According to Neale *et al.* (2006) a case study is a comprehensive description of a given phenomenon, but from a new perspective. In the same vein, the principal objective of the present paper is to study the evolution of the different linking mechanisms from HEI within a milieu defined as an industrial district or cluster, but studied using mainly the local systems of innovation approach. The present case study addresses a prime example of a type of geographical area neglected by most of the literature about the changing role of HEIs. This literature has traditionally exhibited two primary aspects: first, a focus on success stories such as entrepreneurial universities located in high tech regions (e.g. Silicon Valley). Second, the analyses of some authors (Etzkowitz *et al.*, 1998; Etzkowitz & Leydesdorff, 1999; Etzkowitz *et al.*, 2000) reveal an inclination towards a “universities’ evolution from ivory towers to entrepreneurial universities” (Plechero, 2007: 24). We argue that this trajectory is an

oversimplification and it doesn't apply exactly to some environments where the HEIs have maintained links with industry since almost their inception. Our purpose is to demonstrate HEIs' relevance in low-tech contexts where a pre-eminence of small and medium enterprises (hereafter, SMEs) can be found. Moreover, this aspect will be directly related with some specific local knowledge dynamics. With the case study methodology, we will be able to offer a more complete picture of the previous research questions posed above.

The empirical analysis has been based on the assessment of the qualitative aspects to build case histories by collecting stakeholders' opinions and narratives, by analysing institutional documents and other related studies about the HEI under consideration and its context. According to Yin, building case studies through qualitative analysis is fundamental to obtain a whole perspective of the phenomena and to comprehend the relations between the phenomena and the context (Yin, 1994). Our case study has included different data collection techniques (i.e. interviews, document analysis and observation, among others) which have provided a more complete picture.

3.1. Level and unit of analysis

The case study focuses on a particular HEI from a historical perspective, analyzing its evolution in terms of the internal and the external changes, in a context characterized by the dominance of traditional industries. The web of relationships with the environment are analysed in a broad, inductive manner, taking into account the questions that have been contemplated in the literature and the issues arisen from the case study. For instance, the geographical delimitation has been done firstly in a pragmatic manner, including every county in the so-called *Valencian Central Districts*. Secondly, the area of influence has been completed *ex-post*, once the linking mechanisms with the society have been analyzed.

The unit of analysis has been the *individual* (academics and university managers). First, the *university managers* were interviewed to draw a picture of the institutional evolution of the last thirty years (the rest of the period analysed is based on semi-structured interviews to two local historians). Second, *academics* (from different knowledge domains: engineering and management) were studied as a starting point for building up their web of relationships (internal or external; local, regional, national or international; informal or formal; and direct and indirect) with other agents (i.e. firms, technology institutes, governments at different levels and industrial research organisations). With this analysis, we have been able to offer more empirical insights to the local systems of innovation approach in terms of the contribution of a polytechnic in a low-tech milieu.

3.2. Research Techniques

Different established processes for conducting a case study can be found in the literature. The present study has followed a guide suggested by Neale *et al.* (2006) and additional recommendations made by Collier (2005). The general process has been composed by four phases: 1) planning or designing the research 2) collecting data or field work 3) analyzing data, and 4) disseminating findings or writing the report.

The first action included in the planning (research design) phase was to identify the interviewees that would be involved. The potential interviewees identified were divided into three levels:

- *Institutional level (university managers)*: We asked university managers about the principal *shifts* in terms of university governance, new roles in management, etc. Afterwards, this information was contrasted with several official documents, such as, Strategic Plans or Annual Reports. This analysis allowed us to identify the principal *periods* of the HEI historical evolution.
- *Academic Level (academics)*: The main *incentives* and *motivations*, and the way they have changed overtime were analysed, besides the *activities* undertaken by academics. These activities were differentiated between academic activities (teaching and research) and extra-academic activities (relationships with its socioeconomic environment). After the analysis the future lines of action of the HEI under study were drawn by asking these academics about their *perceptions* in terms of their confirmed and potential contribution.
- *Open Level (other interesting individuals)*: Throughout the research process, we left room to include any person who was considered as essential (*snowball technique*). We identified what additional information (documents, annuals, strategic plans...) was needed and from whom through the interviews and from the literature interviewees were recommending. That is why during the process of interviewing some unexpected issues emerged and needed to be addressed by other collecting techniques such as document analysis.

The next step was to develop the interview protocols, for instance, the rules that guide the administration and implementation of the interview. First of all, the interviewees were informed by the researcher through a letter about the project, the content of the interview and the way it would be conducted. It was also necessary to develop an interview guide for each group of stakeholders (questions slightly differed for each one), which would include an informed consent form. After the interviews had been done by the researcher, the next step was to review all the relevant documents and all the interview data.

4. Empirical Results

4.1. The Evolution of HEI's Local Role: Empirical Insights

This paper aims to show the development of a particular type of HEI with more limited aspirations than the world-class universities typically analysed in the literature. It is not located in an area with abundant high-tech companies. It does not enjoy a huge endowment. Its departments are not packed with world-class academics with access to cutting-edge facilities. Nevertheless, this HEI has been an institution that, in parallel with its European counterparts, has been playing numerous roles throughout its more than one hundred years of history. That is why such an evolution should be well documented in order to have new analytical tools to facilitate the adaptation of educational and local development policies to regionally-based institutions and needs.

Achieving this aim will entail mapping out what a local innovation system has been, and how the university has been positioned within it. Subsection 4.2 will introduce the reader to the context under consideration; the subsequent sections delve into the development of the institution's role across three sequential stages. First, section 4.3 deals with the period between the creation of what became the predecessor of the current local polytechnic school, and its subsequent integration with the *Universidad Politécnica de Valencia* (1828-1972). Second, section 4.4 analyses the period from the 1970s to the telecommunications boom of the mid-1990s. Finally, the current roles of the HEI over the last fifteen years are discussed in section 4.5, focusing on its increasing number of collaborative mechanisms.

4.2. Background and the Local Context

Our focus of analysis is on the town of *Alcoy*, and in turn, on the *Valencian Central Districts* (VCDs, hereafter) which surround it. Over the 19th century, a process of industrialisation took place in Alcoy¹. Its origin is often attributed to numerous factors (Gabinete Sigma, 1974). First, while the municipality encompassed thirteen thousand hectares, opportunities for growth were limited as only two thirds of these could be cultivated. Second, the area's bountiful sources of water allowed not only for the exploitation of the limited arable land, but also power generation and, subsequently, the installation of the first factories. Third, a very cheap and abundant labour force was readily available from the surrounding countryside to carry out the operational tasks of the production process. A final relevant, though critical, factor in the emergence of industry in *Alcoy* can be attributed to some wealthy landed families from the outlying rural areas who invested their capital in the city with the aim of diversifying their holdings.

As in most places where the Industrial Revolution took root early on, the textile industry is the oldest in the area. Additionally, the utilisation of mills for other ends, such as paper manufacturing, was also witnessed early on (at the end of the eighteenth century)². It was precisely these two industries that propelled others: metallurgy, for example, thrived due to the continuing need for repairs to the machinery dedicated to textile and paper manufacturing. Examples of well-known metal factories can be found in the holdings of two local bourgeois families of the time, the *Miró* and the *Rodes*. Essentially, these three sectors represented the principal engines of local economic development until almost the present day. In addition, many small family-owned shops and workshops made up the rest of the economic landscape.

In terms of economic structure, the most representative sectors in the area today are: textile, toys, plastics, metallurgy, glass making, food products, chemicals, machine manufacturing and electronic and electrical equipment and components. Nevertheless, more important than the aforementioned industries is the service sector, comprised of information technology, industrial design, small-scale commerce, banking, healthcare and other professional

¹ This process of industrialization has been object of study by different local historians. See more in Aracil & García-Bonafe, 1974; Gabinete Sigma, 1974. Indeed, their analyses have served as a reference for historical Valencian studies conducted since.

² This process of innovation lied in diversifying the use of mills beyond textile manufacture. In Alcoy, a priest, who was additionally an industrialist, implemented mills for the paper industry, which then provided packing material for the textile products (Gabinete Sigma, 1974).

branches (SABI, 2010). All of the latter emerging sectors have been possible due mainly to the presence of highly-talented technicians coming from the *Alcoy* HEI and other universities. While these highly-skilled people were creating new firms, the existing industries started to diversify their activities, principally towards the building sector. It should be noted that the present economic structure is the product of an evolution over the past three decades. Over this period of time the aforementioned building sector experienced a dramatic boom, which continued until the global economic crisis of 2008. This growth was due not only to the building sector as such, but also to the related sectors that supported it, both downstream and upstream (namely, banking and real estate).

Moving to a broader geographic perspective, the so-called *Valencian Central Districts* belong to two different provinces of the *Comunidad Valenciana*: *Alicante* and *Valencia*. They do not form an autonomous administrative region, but rather a functional one. They are tied together by historical, socioeconomic and cultural features. First, over the nineteenth century they formed the old circumscription of *Xàtiva* (the so-called fourth province of the *Comunidad Valenciana* region, in addition to *Castellón*, *Valencia* and *Alicante*). In economic terms, the area of the VCDs is dependent on *Alcoy*'s industrial development and on those of its surroundings (namely the towns of *Ontinyent*, *Banyeres*, *Muro* and *Concentaina*). Second, these cities specialize in industries revolving around the textile sector. That is why the underlying dynamics of socioeconomic development have suffered powerful fluctuations attributable to the cyclical problems in the textile industry since the 1970s, or even earlier. Third, the complex task of attracting and maintaining highly-skilled workers has been a common concern within this area, and also linked to the inherent difficulty in diversifying towards other activities beyond textiles. Fourth, a deficient infrastructure endowment, in terms of communication and services, has traditionally characterized this set of municipalities, though an improvement has been observed over the last ten years. Fifth, there has been a slight and continuous population growth throughout the twentieth century. Sixth, a population exodus from the rural areas to the industrial cities took place during the early stages of the industrialization process, though job possibilities in places like *Alcoy* or *Ontinyent* (the two main textile centres) continuously attracted a rural workforce, above all between the 1950s and 1970s. Finally, we must not forget the increase in the presence of a foreign workforce that has typically filled low-skilled jobs.

4.3. The Local Role of an *Alcoy* HEI until its Integration with the *Universidad Politécnica de Valencia*

Following the Local Innovation System approach, we start by considering institutions that have historically supported the local economy, highlighting specifically the role of educational institutions. To this end, a summary of the official names of local HEIs, their objectives, activities, scope and funding system is provided (see table 1). The complex legislation over the period of analysis (from 1828 to 1970s) will be briefly presented. All the information has been extracted from the research of a group of local historians (Aracil & García-Bonafe, 1974; Gabinete Sigma, 1974; Nadal-Blanes *et al.*, 1997; Blanes-Nadal *et al.* 1999) and complemented by interviews conducted throughout the present study.

Throughout the 19th century, an expansion of the industrial sector (mainly the textile industry) took place in *Alcoy*, in parallel with other European industrial cities. However, given the absence of a particular state funding system for industrial education, as previously noted in the previous section, the local industrialists of *Alcoy* initiated a set of negotiations with the local and central government in order to create a technical HEI, and thereby allay their fear of

losing their position *vis-à-vis* their domestic and foreign competitors. Indeed, the Real Fábrica de Paños de Alcoy was the institution responsible for the establishment of the *Establecimiento Científico-Artístico* in 1828. However, it was not until the start of the 20th century, that education funding was assumed by the state, as other European countries had, hence relieving (somewhat) local governments and business associations of their economic onus.

Since the creation of the first technical educational institution in 1828 until the 1970s, two higher education institutions have predominated the *Alcoy* sphere of education. On the one hand, the *Escuela de Peritos* (and later *Ingenieros*) *Industriales*, which is considered the forerunner of the current Campus of *Alcoy* – *Universidad Politécnica de Valencia*), and on the other, the *Escuela de Artes y Oficios*, devoted since the late 19th century to providing a practical education and focused on workshop-based positions, such as graphic designer, illustrator and lathe operator. Apart from these educational institutions, several training colleges also offered specific technical education to factory employees. The following table summarizes the chief milestones in the history of *Alcoy*'s HEIs: their respective evolution can be perceived in each period as many employed different names for the same local HEIs, concomitant with their changing degrees, funding and scope.

Table 1: The official HEIs in Alcoy

Period	Name of the Centre	Degree Offered (around 3 years)	Funding Source	Scope
1828-1853	<i>Establecimiento Científico-Artístico</i>		Local Government and private funds	Local
1853-1901	<i>Escuela Industrial Elemental de Alcoy</i> ³	<i>Industrial Expert</i> (<i>Perito Industrial</i>)	Local Government and private funds	Local National, from 1877 to 1901, due to the existence of only one HEI with these features.
1886	In parallel to the existence of the Escuela Industrial, the School of Arts and Crafts of Alcoy is established in 1886	<i>Industrial Expert</i> (<i>Perito Industrial</i>)	Local Government and private funds	Local And also National, from 1877 to 1901, due to the existence of only one HEI with these features.
(1901-1902) – 1907	<i>Escuela Elemental de Industrias de Alcoy</i> + <i>Escuela Superior de Industrias de Alcoy</i>	<i>EEIA: Technical</i> (<i>lower than Experts</i>) <i>ESIA: Mechanical, Chemistry and Electrical Expert. En 1902, Textile Expert, and in 1907, Quantity Surveyor.</i>	Local Government	Local
1907-1928	<i>Escuela de Industrias de Alcoy</i> (<i>merge of the two previous schools</i>)		National Government (and Local)	Local
1928-1942	<i>Escuela Elemental del Trabajo de Alcoy</i> + <i>Escuela Superior del Trabajo de Alcoy</i>		State	Local
1942-1964	<i>Escuela de Peritos Industriales de Alcoy</i>	Mechanical Expert, Electrical Expert, Chemistry Expert y Textile Expert.	State	Local
1964-1994	<i>Escuela de Ingeniería Técnica Industrial de Alcoy</i> (In 1972, this School is integrated within the <i>Universidad Politécnica de Valencia</i>).	<i>Engineer</i> Disciplines: Mechanics, Textile, Chemistry, Electrical and Electronics In 1992, Telecommunications	National (and also Regional) Governmental Bodies	Regional

Source: Own elaboration from Blanes-Nadal (1999) and personal interviews.

³ This institution began operating as such in 1855 due to certain administrative difficulties.

The first industrial-era HEI in Alcoy, the *Establecimiento Científico-Artístico*, deserves particular consideration as its origins are closely connected to the industrial reality of that moment: some of their founders belonged to the main industrial families of the town. They were convinced of the importance of giving workers a technical education to better anticipate technological change in the industry. The initiative of founding the *Establecimiento Científico-Artístico* -- considered the oldest antecedent of the current Campus of Alcoy (UPV) -- came in 1828 through the financial support of both the *Real Fábrica de Paños de Alcoy* and the local government. Until that year, RFPA was the main textile provider of the Monarchy, but over time it shifted its role in order to become an employers association, defending the interests of the local textile industry. The objective of this fledgling educational institution --the *Establecimiento Científico-Artístico*-- was primarily “to train technicians who, after a theoretical and practical preparation, were able to competently manage the different sections of a modern mechanized weaving factory”⁴ (Blanes-Nadal *et al.*, 1997: 7, my translation). Teachers were also supported to firm-based knowledge demands, particularly in two fields: chemistry and mechanics. For instance, they disseminated the latest technical knowledge and techniques through their teaching, in parallel with the introduction of updated bibliographies on their subjects. In fact, the first two privately-funded *Cátedras* (Chairs) were in these two disciplines --Mathematics and Applied Chemistry-- and their creation was possible thanks to a renowned industrialist’s inheritance. Additionally, to meet the increasing energy demands of factories beyond water-driven machinery, one of the most important challenges faced by faculty members of this new HEI, was to seek out mineral deposits in the neighbouring areas, such as coal.

A few years later, in 1853, the *Escuela Industrial Elemental* was established (Blanes-Nadal, 1999), though it did not open until two years later. An additional -- and critical -- incentive for founding this educational institution was the prohibitive cost of sending workers to foreign countries (such as France and England) for training. In parallel, there was also an influx into the area of Alcoy of scholars and foreign experts with sufficient knowledge to teach the workers. Industrialists were fearful of losing their competitive position in terms of the quality of their products, so they adopted a proactive --and self-interested-- approach by creating a technical school, thereby taking advantage of the increased teaching resources available. It is also important to remark here the dependence of local firms (mainly textile and paper producers) on machinery providers and chemical products from abroad. The first incorporation of continuous listing paper machinery and Jacquard looms took place in the 1880s: this importation vaulted the town of Alcoy to levels of technological competitiveness comparable with the principal Spanish industrial centres of the time. Since then, a critical mass of metallurgy began to emerge, adapting the foreign technology to the local production processes. Moreover, the constant need to import coal from England compelled the town to initiate a large-scale transportation project: the railway. Such a project required foreign participation and funding, since the local leaders felt themselves unable to meet the challenge on their own. Finally, an English partner was contracted, and following four years of enormous activity, the railway was inaugurated in 1893. The line continued in use until its dismantling in 1969.

⁴ “El seu objectiu era clar: Formar tècnics que, després d’una preparació teòrica i pràctica, foren capaços de dirigir competentment les distintes seccions d’una fàbrica de teixits moderna i mecanitzada” (ibid).

In general, the *Escuela Industrial Elemental de Alcoy* was a small educational institution (in terms of numbers of students and staff) until the decade of the 1980s, when it started to grow considerably. Until then, there were 50 individuals at a time, on average, between teachers and students. The latter had to be at least 12 years of age when they entered the *Escuela*. Their attendance was voluntary and there was no limit to the number of years of study. This is understandable, since the student body was comprised not only of young people who had the luxury of dedicating themselves full-time to studies, but also of adults studying in tandem with arduously long workdays and low salaries. For the same reason, the school functioned mostly at night. All of the students believed that, despite their exhaustion after twelve-hour workdays, a better education could offer opportunities for higher-paying jobs within the local area. In fact, the scope of this kind of school was primarily local. Their personnel, in turn, combined their main activity, teaching, with others. For instance, some teachers had their own firms while others were employed in a local production plant. Meanwhile, other teachers were engaged in local government issues. This aspect is noteworthy, since it clearly represents the fluidity of institutional divisions at that time. However, as one of those interviewed noted, an educator's interest in interacting with the industrial environment was a *conditio sine qua non* for survival: teachers consistently received irregular salary payments and, therefore, were obliged to seek out supplementary income. Moreover, it should be remembered that, despite the economic expansion of Alcoy during those years, poverty remained endemic and the communications limited (roads traversing the surrounding hills were consistently in desperately poor condition). In order to attend to those workers with precarious conditions, the industrialists and the Church jointly created the *Círculo Católico de Obreros* (1875). A few years later, and defending the same causes, in 1880 a new social organisation emerged – *La Sociedad Cooperativa "El Trabajo"* – this time composed of non-Catholic workers and devoted to, among other things, assuring them a regular payment in the case they fell ill. The cooperation of these two opposing organisations lay on the ideological differences of two different groups of workers. The former were much closer to the industrial class and the Church, while the latter were part of the leftist Internationalist and Luddite movements in Alcoy.

All the endeavours, carried out mainly by the industrialists, required financial instruments that were largely provided by a local savings bank: *Monte de Piedad y Caja de Ahorros de Alcoy*, founded in 1875. This organisation then merged with other local savings banks, due to the increasing need for capital, and remained until almost the present day the central financial organisation for the whole local system. Of course, it was likewise intimately linked to the main actors of the local system: the industrial head managers and the most venerable families who controlled the principal local decisions.

In general terms, we know the story about how the industrialists were behind the creation of a school to train technicians. Although this model of technical training was spreading throughout Spain as an idea, there was – surprisingly-- only one *Escuela Industrial Elemental* in all of Spain, located precisely in the municipality of Alcoy, from 1877 until 1901 (Blanes-Nadal *et al.*, 1997: 8). This fact offers a glimpse of the importance of the town of Alcoy during this period of industrialization in Spain (Aracil & García-Bonafe, 1974; Blanes-Nadal *et al.*, 1997). However, the local business community on many other occasions attempted to train apprentices directly with their own teams. This fact made placement of the school's graduates more difficult, and thus, these alumni had to look for

a different (or worse) job than what they were expecting. Moreover, since the Industrial School had a very limited enrolment, it was very difficult for a worker to access to this kind of technical training, and thus become an active part of the local innovation system. During the years 1950-1960, industries were required by law to allow employees to enjoy 2 hours of leave. This way, employees could attend the *Escuela Industrial* to upgrade their skills. It should be noted that at that time employees worked every day except Sunday, a day of rest and church-attendance. In that sense, industrialists were demanding reforms to accommodate the legal and political framework to that new situation, which required a higher level of skills and competences.

Summarizing, the period from the creation of the first Industrial School (1828) to its integration with the *Universidad Politécnica de Valencia* (1972) was turbulent-- not only for Alcoy, its industry and its HEI, but also for Spain, in general. Despite this, we can observe a very solid bourgeoisie that was not only linked to the most important industry at that moment, but was also in charge of many public bodies, such as the local government and the industrial school of engineering, and private ones, such as the *Monte de Piedad y Caja de Ahorros de Alcoy* (a local savings bank). Apart from this group, very few people enjoyed a reasonable living standard; a great part of Alcoy's population was living precariously, with few links with the principal local institutions, except the link of the factory worker with his or her employer. In that sense, although we can affirm that the HEI had fluent relationships with government and also with industry, if we look at the whole *system*, we find a part of the population demanding better working conditions but limited to the periphery of the decision-making processes, controlled mainly by a handful of rich families. On the other hand, there were a group of highly-talented technicians that seems to be the *target* for the HEI's teaching activities. From viewpoint of the external forces, we have also to highlight the influences: the international sources for the machinery and chemical products needed in the primary industries of textile and paper. The external actors found in Alcoy a bustling municipality with three different social classes: a firmly-entrenched bourgeoisie, a pool of highly proficient technicians and an abundant (low-salary) workforce. This latter group did not require the high wages demanded elsewhere in Europe. On the other hand, the HEI personnel were in charge of adapting the external knowledge to the local context conditions. For instance, a group formed by several businessmen and technicians began a series of negotiations to build a railway line, not only to import coal, but also to facilitate an outlet to the sea for the products manufactured in Alcoy. Unable to find a partner for the project, neither locally or nationally, these industrialists decided to seek financing abroad, particularly in England, where they succeeded in obtaining financial support. This railway was dismantled in the 1969 due the scarce of funding. Therefore, with the local innovation system approach, we find a very articulated system controlled by the bourgeoisie, the Church and some middle-class technicians with a clear fluidity of divisions. However, there is still a part of this story, the working-class, which requires greater study and attention in order to understand the role it assumed within the local context. The only available information source is based on materials from the same HEI, and newspapers that were controlled by the same people. In this sense, the Industrial School of Alcoy played a crucial role within the local system, due to the complete technical services it provided to the industry through its staff of businessmen and people closely aligned to the sector. At that time, this supporting role was assumed uniquely by the Industrial School of Alcoy until the arrival of new players beginning in the 1980s on, such as consultancy firms, institutes of technology and others.

4.4. The Transition Towards a Satellite of a Broader University

In 1972, the *Universidad Politécnica de Valencia* (UPV) underwent a series of changes, among them the adscription of new centres, such as the Industrial School of *Alcoy*. The UPV thus emerged as an external force triggering a substantial shift in the governance structures of the Alcoy HEI, and bringing new linkages and capabilities to what had been until then a local educational institution. Among the principal changes that affected the university in the years that followed, the 1983 Universities Act is especially remarkable because it allowed the formalisation of relationships with the environment through contracts at the institutional level⁵. These linkages were not allowed until that Act, but surprisingly we witnessed not only how the government began to promote a series of practices that had just started to be legal, but also how this type of relationship (mainly formally illegal until then) had curiously been the *raison d'être* of the existence of the Industrial School of Alcoy. In that sense, as stated in the previous section, *Alcoy* was special in terms of the linkages between industrialists and academics from the Industrial School, now part of a Polytechnic University. As one interviewee affirmed, most of the professors were also businessmen, and thus there existed a fluidity of relationships between university and industry-- above all within the *Textile and Paper Engineering Department*. But the legislative changes also affected the tasks of professors who were required to spend more time on research and less time interacting with society. The interviewee also stated that the most habitual kind of collaborative mechanism, before and after that Act, was based on tailored consultancy projects, such as chemical analysis, or professional advice about adaptations to the production process.

From the viewpoint of *context*, there was a significant increase in firm creation in previously-existing sectors, and likewise in certain emerging sectors (mainly electronics-based areas and services for small businesses). This allowed a greater range of choice and possibilities for the university to contribute to these emerging industries, whilst also generating greater complexity in analysing the innovation processes. Since the 1980s, there was also an increase in the number of students, which involved an increase in both faculty and administrative staff. The latter was a new addition to the Alcoy HEI, as until then most administrative tasks had been undertaken by the faculty. The emergence of managerial bodies, thus, marked the beginning of the largest qualitative and quantitative changes in the history of the Industrial School of Alcoy, which would additionally continue expanding from the mid-1980s onwards.

In addition to their traditional teaching role and under the influence of several legislative changes regarding higher education, the new teachers' duties incorporated research and service offerings to the professional environment, (though the latter was only *voluntary*). In fact, the reduction of paperwork due to the introduction of supporting staff allowed the faculty to engage in what were for them *new* activities: they could devote some time to research. Although the previous strong linkages with industry were increasingly fading away, though they did not entirely disappear.

Concomitant with the increase in the number of both teachers and students, one of the most important changes regarding the university organisation was the creation of *Departments*. Departments internally structured and shaped

⁵ The way the linkages were established, before the approval of this 1983 Act, was based on contracts at the individual level between professors and industrialists, and not on behalf of the university.

the university in different knowledge domains, among which again highlight the *Department of Textile and Paper Engineering*. Yet, in Alcoy's industrial school the creation of the departments did not mean that they were composed of academics with a PhD, but on the contrary, they were primarily formed by technicians (in Spanish, *Peritos Industriales*). From that period on, the academic staff at Alcoy had to undergo a process of training, curriculum development and promotion aligned with the academic practices in larger universities. Indeed, until 1991, Alcoy did not offer doctorate coursework, or the full 5-year undergraduate degrees that would be normal in most Spanish universities. After 1991 the School of Alcoy added one PhD course in Textile and Paper Engineering. The eponymous department overseeing this degree was indeed the most connected to the industrial environment because of its wide range of services it provided to several textile and paper SMEs. There were still many lecturers who were also businessmen, or at least, persons very closed to local businessmen, though that number was decreasing, thereby setting on the figure of the *Profesor Asociado*. This figure of the *Profesor Asociado*, within the new organisational structure of the university that started in the decade of 1980s in Spain, deserves some additional remarks. The *Profesor Asociado* was mainly conceived as the figure responsible for keeping alive the linkages between the university and the firms located in the area, because only people with a certain experience in the business world could be contracted under that title. On the other hand, the rest of the university personnel was not adequately incentivised to work together with industry beyond their own preferences, or put differently, academics engaged with industry projects were only those who *personally took such a decision*, there not being clear incentives to do so otherwise.

From the *funding* perspective, the 1983 Universities Act made explicit reference to the independence of academic institutions and the devolution in terms of funding and planning to the Autonomous Regions. In parallel with the regionalisation of higher education policies, a new important institution was added to the innovation systems: the technological institute. All the technological institutes were created as sectorial organisations and adopted some of the roles of the earlier Alcoy Industrial School. Two institutes of technology were located in this area: one devoted to the plastic industry (AIJU, located in Ibi) and the other focused on the textile industry (AITEK), located in Alcoy itself. As a result, the new figure of the institute of technology *broke* with the previous *institutional hegemony* of the industrial school in terms of knowledge exploration, creation, dissemination and application. Yet, this exchange of roles can only be understood under *the tailored services to firms' umbrella*. While the Industrial School continued to support local industry by training future technicians and offering several consultancy services to SMEs, from the 1980s on, its personnel had to upgrade their academic CV (internal dynamics of academics), and therefore its contribution to the local environment was not as direct as before. On the other hand, technological institutes were directly involved in several projects devoted to upgrading the firms' technological capacities (this had been indeed its explicit mission since its creation in the mid-1980s). Moreover, the composition of these new organisations was similar to the earlier industrial school. Their partners were the same industrialists, as well as different manager associations grouped around a specific sector: for instance, AITEK – the textile technological institute-- was formed by several textile firms and its sectorial managers association (ATEVAL). For that reason, they started to work together with the technological institute, while the Alcoy's HEI concentrated its efforts on building new kinds of relationships with the academic world. Some years later, around 1995, the Alcoy's HEI began to reinstate formal relationships with the local industry. Meanwhile, for almost an entire decade the technological institute had been confirmed as the main partner of the textile firms in the area. In this way, AITEK gained a comparative advantage

from the standpoint of building confidence in proposing new research projects, development and innovation in tandem with its industrial partners. Despite the increasing separation between the roles of both institutions --the Alcoy's HEI and the technology institute-- there were still some collaboration between them. For example, in terms of providing expertise, university personnel were teaching some specific courses which were offered by the institute of technology, above all during the late 1980s and throughout the 1990s. Yet, this connection was gradually weakening over time. Moreover, the cognitive distance between the education level of firms (and thus its new technological partner, AITEX) and the university was enlarged, and this phenomenon did not occur in the relationship between the institute of technology and local firms⁶.

In summary, the period from 1970 to 1995 is vital to understand the current situation of the local innovation system in Alcoy for several reasons. First, within this period we witnessed a process of democratisation not only at the university level (first democratic elections), but also at the societal level (the dictatorial regime ended in Spain). Moreover, this process of democratisation led to a massive access to education at all levels and thus, an increasing number of students and teachers were engaged in university life. Second, we could see an appearance of new actors, such as the institutes of technology, which in the case of Alcoy were supporting industry in a more direct way to, while the university was involved in a project of promotion and academic curriculum development with regard to its personnel (who were increasingly involved in doing research). Third and much linked to the latter observation, the Alcoy's HEI was preparing a process of professionalization of its relationships with its environment through the creation of a new figure who would concentrate its contacts, after seeing its separation from the industrial environment and the promotion of new industrial policies that incentivised university-industry linkages. Although during the first years, in the case of Alcoy, this role was assumed by only one person, a team of professionals was gradually formed. Fourth, the identification of local demand for knowledge was mainly assumed by the technological institute for mainly two reasons. First, the university personnel started to be engaged in several research projects with little connection with the local demand of firms, beyond the aforementioned figure of the *Profesor Asociado*, or some teachers with similar interests. Second, the technological institute generated a continuous source of tailored-services demand in terms of consultancy and other kind of technological projects, just as had occurred earlier with the nascent Industrial School. Moreover, all the actions carried out by the technological institute were supported by public industrial policies.

4.5. The Configuration of Today's Campus: Alcoy's Local Role within its Local System of Innovation

The second half of the 1990s decade is considered a vital milestone within the history of the Alcoy's HEI because, for the first time, 5-years studies were introduced within the university programme: Industrial Organisation Engineering and the *Licenciatura* in Business Administration. To access to the former, students had to finish studies

⁶ In those latter there was no PhD level employee until the beginning of the 21st century.

in technical engineering (3-years), and then they had to be enrolled in Industrial Organisation (2-years). Moreover, the school started to monitor its relationship with industry and developed for the first time sets of indicators. This is the main reason we found it impossible to have series of indicators, such as number of contracts⁷ with industry. One of the most far-reaching shifts at all levels was the introduction of information and communication technologies (ICTs) in the university's everyday life. ICTs allowed it to redefine numerous subjects and even to create new educational offerings, such as telecommunications and computer engineering. While the former was introduced in 1992 in Alcoy University, the latter was incorporated in 1996.

In 1995, a new figure was created --the *Area of Relationships with the Environment*⁸-- in order to enhance and improve its contacts with industry. The model was adapted from another *interface structure* created in the main campus of the *Universidad Politécnica de Valencia*. Its rationale came from the thinking that the Alcoy University had traditionally been "closed to the whole society, since it was serving only a few families"⁹. Within this new structure a set of services were established and offered to society in order to facilitate or regulate those university-society linkages. First, from the student viewpoint, it was possible to put several job positions (offer side) in contact with students (demand side), which until that time was managed in an informal way by teachers or by industrialists. After a period of experimentation, these job placement services were improved and are nowadays better managed and benefit both sides: the manager can gain expertise from a high-skilled worker and the student can initiate a legal and compensated relationship within a firm, or with other kinds of organisations: technology institutes, managers associations, foundations, among others. This is the so-called *Practicum*, which had been working for years in other contexts, even in the current case of *Alcoy*, but in an informal way. Yet, the possibility of undertaking the final dissertation (required before a diploma is granted), through placement in these organizations has been one of the most successful ways to start collaborative projects between the university and its environment. Indeed, we have found this linking mechanism to be one of the most successful with regard to university-society collaborations since its formalisation in 1995.

The overall explicit mission of the *Universidad Politécnica de Valencia* (and also Alcoy University's mission) since 2007 has been *to provide its students with an integral education through the creation, development, transfer and critical reflection on science, art and culture, whilst being respectful with ethical principles; an education decidedly leading towards aiding our students in finding an appropriate job in accordance with their studies* (UPV, 2011). Once we have seen that the university aims to help its students to find "an appropriate job" the problem lays in *how* to achieve this objective. One way is to develop a project where a student is able to implement the theoretical knowledge learnt throughout her university studies. This activity has been labelled by one interviewee as a "win-win strategy", since students can apply part of the skills acquired at the university, while the host organisation can explore new areas by implementing new approaches coming from the university's expertise (e.g. an engineer

⁷ Moreover, the existence of confidential conditions in the contracts has not allowed segregating the analysis into different knowledge domains in order to see their evolution throughout the period of study.

⁸ In Spanish, *Área de Relaciones con el Entorno*.

⁹ This quote is extracted from the conducted interviews with UPV academics and managers.

candidate), via the intercession of a university teacher as supervisor. Yet, the culmination of the project could not be considered the end of that relationship between the university, student and host organisation, as many examples can attest, but rather the starting point. On the one hand, the student could find a job in the same host organisation that helped her to implement the idea for her final thesis. From the host organisation perspective, in turn, new areas could be explored and exploited thanks to the chance taken by the university student and her supervisor. And last, from the standpoint of the university professor, participation in the project could be the starting point to carry out new projects with the firm, as a trusting relationship has been established with the former partners. Moreover, the professor might have encountered certain shortcomings in the organisation that could be addressed through new research projects (or through other kinds of collaboration such as tailored consultancy services). In fact, we find illustrative the case of a particular university teacher (from the Department of Business Organisation) who has gained a great deal of knowledge from the firms located in the area of Alcoy, by utilising this particular kind of relationship between his students and the different heads of several organisations (not only firms but also manager associations). After observing how a university faculty can comprehensively assess its environment, multiple ways of interaction emerge. In addition, the contribution of the university becomes more visible as its members are interacting with their surrounding environment and, in the best case, improving the absorptive capacity of the productive environment¹⁰. Unfortunately, the explicit incentives of the UPV have not been focused on establishing linkages with the local environment, and only those with a proactive attitude to do so have been part of this group (a minority). Among them we can highlight most of the *Profesores Asociados* and other professors with previous connections with local firms.

The possibilities for collaborations similar to that mentioned above have increased, but interviewees have stressed the problems generated by the disconnection between the university's offerings and the actual needs of firms located in the area. This issue is germane to one of the topics within the innovation systems approach: the disarticulation of the system provoked by the different actor dynamics in the search for and implementation of innovation projects. The university has tried to tackle this problem by organising several seminars to (1) serve as *an open space to debate* and (2) communicate the existing and new educational and research offerings. Regardless, the university has also extended its scope and has sought out partners in research endeavours or other kind of collaborative projects beyond its traditional typical sphere: Alcoy and its influence area, the VCDs.

Additionally, we found another disarticulation in the local system: between AITEX (a technological institute) and the Campus of Alcoy (the university). Both institutions have started to compete in attracting students who are interested on Textile Engineering Studies. Yet, in 2010 AITEX signed an agreement with a private Valencian university (*Universidad Católica San Pablo - CEU*) to offer a new Master of Technological Innovation and Technical Textiles. This news was poorly received by the faculty of the Alcoy's HEI, since they felt the regional governmental bodies were duplicating efforts and resources to provide quality technical education in the field of textiles.

¹⁰ Additional information is not available, since I have found certain constraints when closely examining these issues. Constraints are shaped by ethical and confidential issues.

4.5.1. The Roles Played by the *Area of Relationships with the Environment*

The *Area of Relationships with the Environment* –considered an interface structure between the university and its environment-- is integrated within the Campus of Alcoy, unlike other models where one finds it outside the university. There are five main divisions within this structure:

1. the Division of Employment (and Practicum) services,
2. the Life-long Learning Centre,
3. the Technology Transfer Office,
4. the Institute for the Creation and Development of Enterprises (IDEAS), and
5. the Institute of Education Sciences¹¹.

These different centres are located in the same place, a big office, and are tightly connected to the main offices in Valencia (at the *Universidad Politécnica de Valencia*). Among these five departments, three of them (the first three) are able to generate income for the university, so they are thought to diversify the funding sources, as Clark claimed when he talked about the entrepreneurial university (Clark, 1998). The last report published by the *Area of Relationships with the Environment* showed an increasing number of contacts between the university personnel and other surrounding institutions. In that sense, we can highlight the Campus of Alcoy: it has garnered better results compared with the two other UPV Campuses (*Valencia* and *Gandía*). In the remainder of this section we will present a summary of the activity of the Campus of Alcoy at different levels¹² since a set of new contributions -- translated into new services-- has been established at the university level in order to serve mostly the industrial environment.

The division of employment services has been in operation since 1995. Yet, since 2006 it has been working under agreement with the *Valencian Employment Office*, to manage not only job positions for university graduates (and students), but also any job vacancies for any unemployed. Additionally this office offers specific courses to improve candidates' possibilities of finding a job and their economic results have been positive since 2006. With regard the previous period, we have to highlight the important role of this office in establishing linkages between students doing their final thesis and the employers¹³.

The life-long learning centre was established in 1997. Its evolution also shows a positive and increasing trend not only quantitatively, with a growth rate in terms of economic profit of 148% between 2002 and 2008, but also qualitatively, due to the good reception that the on-line courses offerings have experienced. However, as we could

¹¹ We did not develop the role of this institute, since it has almost no connections with the environment, thereby being a provider of internal psycho-educational services for teachers and students.

¹² In the former sections, we did not present all of them due to the scarcity of available data for the period of analysis.

¹³ As we have already explained in pages 18 and 19.

extract from the interviews, this centre had to regulate the incorporation of new courses, since its manager realised that some teachers were offering simultaneously the same (or very similar) courses they were already teaching within their official studies programme. This centre has also been a bridging point to connect several technology-based companies interested in putting into practice their software or their management tools for their future or potential users. This way, the university has served as a *testing-institution* where students have learnt the most updated techniques and software in an affordable way, its teachers being not only academics, but also professionals from the productive environment.

The technology transfer office of the Campus of Alcoy (hereafter, CTT¹⁴), established in 1995, has pursued the mission of facilitating the research activity of UPV personnel and to managing the transfer of the knowledge created or generated by them. In order to accomplish such a mission, CTT has carried out a set of services addressed not only to their internal users (academics), but also to their external users (mainly private SMEs and public bodies). The first task undertaken by its manager, for example, was to collect the research offerings of Alcoy-UPV's members into a sort of catalogue, called CARTA¹⁵, as all the UPV faculties did. Once he collected all the research areas and possibilities to interact with others, he started to act as a *messenger* by informing others about the different policies and *calls* from different public and private bodies. And thus a process of professionalisation started with regard to university-society linkages, which has presented a positive trend in terms of number of contracts at all levels. It is remarkable that, although the CTT's action focus has been mainly regional, or even local at the beginning, several reasons have to do with the search for non-regional partners in the Alcoy-UPV Campus' activity. First, the bad financial situation of regional public bodies reduced the chances of accessing those funds. Second, the very trajectory of particular knowledge domains required the collaboration with firms and other organisations that were inexistent within the territory, and therefore they had to be contacted despite their distant location. And third, there was no explicit incentive to collaborate locally, so both academics and managers exploited all the opportunities they found at the national and international scale.

Within the *Area of Relationships with the Environment*, we can also find the IDEAS Institute. The Alcoy team consists of one person, though she can be supported by counterparts from Valencia since its creation in 2000. This manager has been offering professional support to entrepreneurs from the maturation of their idea to the implementation of their firm. The IDEAS institute aims to promote and develop the entrepreneurial culture within the UPV members. In *Alcoy*, the number of total firms created has been 18 (none of them a spin-off created from university research results) from 1999 to 2008, while the institute has given advice to more than 500 people within the same period. In that sense, we can conclude that although IDEAS has opened new ways to contribute to its surrounding environment, its influence has been minimal, in quantitative terms. Moreover, we have to take into account the existence of three agencies with very similar services within the local system: the *ADL* (Local Development Agency, which depends on the local government), the Local Chamber of Commerce and *CEEI*

¹⁴ In Spanish, *Centro de Transferencia de Tecnología*

¹⁵ <http://www.upv.es/carta/>

(*Centro Europeo de Empresas Innovadoras*), the latter being the most fruitful in terms of firm creation and from the users' perception¹⁶.

Within the last analysed period (1995 to 2010), we can observe how the local government and the university did not jointly collaborate in almost any project, until the creation of a Cátedra, named *Alcoy, Cuidad del Conocimiento*. The objective was to elaborate a Strategic Plan for the city of Alcoy. But, the problem found within such a project was the scarcity of endowments and the unwillingness of the local governing party to implement the different lines of action proposed. Although there were a great deal of potential projects to undertake, and for the first time all the local actors were involved in the elaboration of such a strategic plan, the project was finally rejected and no more funding and efforts were put into it. Despite this pessimistic conclusion, (in 2010 the local government changed its components), there is still a chance to reconsider new collaborative projects between these two spheres.

Finally, one new way that the university has opened itself to interact with society has been based on the creation of *clusters*. Though beyond their academic definition, these organisations are composed of several public and private bodies, which pursue common objectives. I have remarked *beyond the academic definition* because Alcoy clusters are like *the new business organisations*, which additionally have the support of the university. In fact, the most common promoter of new projects has been the university personnel. The two examples of Alcoy clusters (Aero Cluster and Design Cluster) are based upon two emergent sectors that have little connection with traditional industries. Even so, they are trying to collaborate with them through interdisciplinary projects, such as textile products development for the aeronautics industry and the elaboration of a catalogue with all the local designers and the services they offer. The impetus that the university has offered in this sense has been reinforced by new legislative changes which incentivise university personnel to interact with society, (only since December of 2010). Therefore, stronger ties (than those already observed) between university and its surrounding environment are expected.

5. Concluding Remarks

This paper aims to show how a specific HEI has played an essential role in a low-tech context, and under which conditions it has operated. With over a century of acquired experiences, it can be concluded that its local role has adopted diverse forms in accordance with internal and external circumstances, thereby establishing clearly three principal stages. The first period, stretching from its inception (19th century) to its affiliation with the UPV, was characterised by a centralised form of interaction with certain groups of society, given the case that a solid bourgeoisie coincided mostly with the two other spheres: the local government and the industry. This way, and from the local innovation system approach, we find a very articulated *system of actors* and a fluidity of divisions between them. But we also observed a wide swath of society that most times was not part of the decision-making process:

¹⁶ I have personally utilised this service with some friends. We created two firms with the useful support of CEEI's personnel.

blue-collar workers. Thus, political and legal factors, many of them external, shaped this local group of actors and pulled them in different directions, thus weakening the links between the school and its local environment. Alcoy's industrial school had been historically characterised by fluid interactions between academia and industry, but from the 1980s a process of professionalisation of its academic personnel brought an increasing separation between academic activity and local industrial needs. Other organisations, like the institutes of technology, came to cover this gap. The academic staff did not feel adequately incentivised to undertake collaborative projects with industry. Accordingly, the HEI remained apparently passive in fulfilling the local needs of industry. Despite this, the Industrial School was not totally isolated with respect to its local context, since part of its personnel continued to work together with industry – *Profesores Asociados*-- on their own, or in an informal manner. Apart from this, we can also conclude that this process of becoming a part of a bigger (world-class) university brought better conditions to face several challenges such as the ICTs revolution, that is, the diversification of the local existing industry or the introduction of research findings into traditional industries, as may represent the textile industry. The picture of a palm tree could better represent the strategy that the Campus of Alcoy has followed from that stage, having solid roots in the local milieu and several branches in different places according to the contacts their personnel were built and consolidated. This way, we have observed increased participation of the university personnel at different scales apart from the local one: for example, European Projects or R&D National Plans. In this sense, the role of contributing actively in local development has been more in training highly-skilled and talented people, than in transferring technology directly to firms, due to the low number of university patents and the inexistent creation of spin-offs. However, certain university personnel have supported their students when they have decided to create a firm, though the entrepreneurial spirit has not been the most remarkable.

Currently, the establishment of two completely new *clusters* (Design and Aeronautics) have started a new collaboration mechanism in order to integrate scientific and technological expertise within a set of local firms and professionals, through the accumulation of a critical mass to face large projects, or to open new markets. This has contributed to the diversification of the existing industry, thus creating new forms of action for the local industry.

Finally, and from a practical viewpoint, this article has attempted to highlight the importance of carrying out historical and context-based analysis when it comes to sketching out the new role of universities in their local systems of innovation. Such an ambitious task would require mapping out their capacities and their priorities and not copying or directly importing strategies from elsewhere. It is also important to highlight the enormous complexity in identifying the indicators suited to monitoring their evolution and, at the same time, being able to perform well in certain rankings or scoreboards. For that reason, we found it more interesting to ask about the university personnel's perception about the evolution of their activities over a long period of time, than to select a set of indicators isolated from their interpretation.

Acknowledgements

The author acknowledges the financial support from the Spanish National R&D Project (Project ref: SEJ2005-05923/EDUC and Francisco Javier Ortega Colomer's Grant: BES-2006-13425). Besides, the author feels indebted to Jordi Molas-Gallart and Fernando Jiménez-Sáez for their valuable comments and suggestions and also to Matthew Zugsay for his invaluable help in the revision of the English language of the manuscript. Errors and mistakes are the author's own responsibility.

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